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PRELIMINARY

S6E1B8 Series

32-bit ARM[®] Cortex[®]-M0+ FM0+ Microcontroller

The S6E1B8 Series is a series of highly integrated 32-bit microcontrollers designed for embedded controllers aiming at low power consumption and low cost. This series has the ARM Cortex-M0+ Processor with on-chip Flash memory and SRAM, and consists of peripheral functions such as various timers, LCD controller (LCDC), AES, ADC and communication interfaces (UART, CSIO (SPI), I²C, I²S, Smart Card, and USB). The products which are described in this data sheet are placed into TYPE2-M0+ product categories in "FM0+ Family Peripheral Manual".

Features

32-bit ARM Cortex-M0+ Core

- Processor version: r0p1
- Maximum operating frequency: 40.8 MHz
- Nested Vectored Interrupt Controller (NVIC): 1 NMI (non-maskable interrupt) and 24 peripheral interrupt with 4 selectable interrupt priority levels
- 24-bit System timer (Sys Tick): System timer for OS task management

Bit Band Operation

Compatible with Cortex-M3 bit band operation.

On-Chip Memory

- Flash memory
 - Up to 512 K+48 Kbytes
 - Dual bank:
 - upper bank : 512 Kbytes(64 Kbytes x 8)
 - lower bank : 48 Kbytes(8 Kbytes x 6)
 - Read cycle: 0 wait-cycle
 - Security function for code protection
- SRAM

The on-chip SRAM of this series has one independent SRAM .

 - Up to SRAM: 60 K+4 Kbytes
 - 4Kbytes: can retain value in Deep Standby Mode

USB Interface

USB interface is composed of Device and Host PLL for USB is built-in, USB clock can be generated by multiplication of Main clock.

- USB Device
 - USB 2.0 Full-Speed supported
 - Max 6 EndPoint supported
 - EndPoint 0 is control transfer
 - EndPoint 1, 2 can be selected Bulk-transfer, Interrupt-transfer or Isochronous-transfer
 - EndPoint 3 to 5 can select Bulk-transfer or Interrupt-transfer
 - EndPoint 1 to 5 comprise Double Buffer
 - The size of each EndPoint is according to the follows
 - EndPoint 0, 2 to 5 : 64 bytes
 - EndPoint 1 : 256 bytes

- USB host
 - USB 2.0 Full/Low-Speed supported
 - Bulk-transfer, Interrupt-transfer and Isochronous-transfer support
 - USB Device connected/disconnected automatically detect
 - IN/OUT token handshake packet automatically
 - Max 256-byte packet-length supported
 - Wake-up function supported

LCD Controller (LCDC)

- Selectable from 44 SEG x 4 COM (Max) or 40 SEG x 8 COM (Max)
- Internal Charge pump can generate 4.6 V at most
- Internal divide resistor is contained (selectable from 10 kΩ or 100 kΩ for the resistor value)
- LCD drive power supply (bias) pin (VV4 to VV0)
- Interrupt function synchronized with the LCD module frame frequency
- With blinking function
- Inverted display function

Multi-Function Serial Interface (Max 8channels)

- 128 bytes with Tx/Rx FIFO in all channels (The number of FIFO steps varies depending on the settings of the communication mode or bit length.)
- The operation mode of each channel can be selected from one of the following.
 - UART
 - CSIO (CSIO is known to many customers as SPI)
 - I²C
- UART
 - Full duplex double buffer
 - Parity can be enabled or disabled.
 - Built-in dedicated baud rate generator
 - External clock available as a serial clock
 - Various error detection functions (parity errors, framing errors, and overrun errors)
- CSIO (also known as SPI)
 - Full duplex double buffer
 - Built-in dedicated baud rate generator
 - Overrun error detection function
 - Serial chip select function (ch1 and ch3 only)
 - Data length: 5 to 16 bits

- I²C
 - Standard-mode (Max: 100 kbps) supported / Fast-mode (Max 400 kbps) supported.
- I²S
 - Using CSIO (ch.5, ch.6) and I²S clock generator
 - Supports two transfer protocol
 - I²S
 - MSB-justified
 - Master mode only

Descriptor System Data Transfer Controller (DSTC) (64 Channels)

- The DSTC can transfer data at high-speed without going via the CPU. The DSTC adopts the Descriptor
- system and, following the specified contents of the Descriptor that has already been constructed on the
- memory, can access directly the memory / peripheral device and performs the data transfer operation.
- It supports the software activation, the hardware activation, and the chain activation functions

A/D Converter (Max: 24 Channels)

- 12-bit A/D Converter
 - Successive approximation type
 - Conversion time: 2.0 μs @ 2.7 V to 3.6 V
 - Priority conversion available (2 levels of priority)
 - Scan conversion mode
 - Built-in FIFO for conversion data storage (for scan conversion: 16 steps, for priority conversion: 4 steps)

Base Timer (Max: 8 Channels)

The operation mode of each channel can be selected from one of the following.

- 16-bit PWM timer
- 16-bit PPG timer
- 16/32-bit reload timer
- 16/32-bit PWC timer

General-Purpose I/O Port

This series can use its pin as a general-purpose I/O port when it is not used for an external bus or a peripheral function. All ports can be set to fast general-purpose I/O ports or slow general-purpose I/O ports. In addition, this series has a port relocate function that can set to which I/O port a peripheral function can be allocated.

- All ports are Fast GPIO which can be accessed by 1 cycle
- Capable of controlling the pull-up of each pin
- Capable of reading pin level directly
- Port relocate function
- Up to 102 fast general-purpose I/O ports @120-pin package

- Certain ports are 5 V tolerant. See 4. List of Pin Functions and 5. I/O Circuit Type for the corresponding pins.

Dual Timer (32-/16-bit Down Counter)

The Dual Timer consists of two programmable 32-/16-bit down counters. The operation mode of each timer channel can be selected from one of the following.

- Free-running mode
- Periodic mode (= Reload mode)
- One-shot mode

Multi-Function Timer

The Multi-function Timer consists of the following blocks.

- 16-bit free-run timer × 3 channels
- Input capture × 4 channels
- Output compare × 6 channels
- ADC start compare × 6 channel
- Waveform generator × 3 channels
- 16-bit PPG timer × 3 channels

IGBT mode is contained.

The following function can be used to achieve the motor control.

- PWM signal output function
- DC chopper waveform output function
- Dead time function
- Input capture function
- ADC start function
- DTIF (motor emergency stop) interrupt function

Real-Time Clock (RTC with Vbat)

The Real-time Clock counts year/month/day/hour/minute/second/day of the week from year 01 to year 99.

- The RTC can generate an interrupt at a specific time (year/month/day/hour/minute/second/day of the week) and can also generate an interrupt in a specific year, in a specific month, on a specific day, at a specific hour or at a specific minute.
- It has a timer interrupt function generating an interrupt upon a specific time or at specific intervals.
- It can keep counting while rewriting the time.
- It can count leap years automatically.

Watch Counter

The Watch Counter wakes up the microcontroller from the low power consumption mode. The clock source can be selected from the main clock, the sub clock, the built-in high-speed CR clock or the built-in low-speed CR clock.

Interval timer: up to 64 s (sub clock: 32.768 kHz)

External Interrupt Controller Unit

- Up to 24 external interrupt input pins
- Non-maskable interrupt (NMI) input pin: 1

Watchdog Timer (2 Channels)

The watchdog timer generates an interrupt or a reset when the counter reaches a time-out value.

This series consists of two different watchdogs, hardware watchdog and software watchdog.

The hardware watchdog timer is clocked by the built-in low-speed CR oscillator. Therefore, the hardware watchdog is active in any low-power consumption modes except RTC, Stop, Deep standby RTC and Deep standby Stop mode.

CRC (Cyclic Redundancy Check) Accelerator

The CRC accelerator calculates the CRC which has a heavy software processing load, and achieves a reduction of the integrity check processing load for reception data and storage.

- CCITT CRC16 and IEEE-802.3 CRC32 are supported.
 - CCITT CRC16 Generator Polynomial: 0x1021
 - IEEE-802.3 CRC32 Generator Polynomial: 0x04C11DB7

HDMI-CEC/Remote Control Receiver (Up to 2 Channels)

- HDMI-CEC transmitter
 - Header block automatic transmission by judging Signal free
 - Generating status interrupt by detecting Arbitration lost
 - Generating START, EOM, ACK automatically to output CEC transmission by setting 1 byte data
 - Generating transmission status interrupt when transmitting 1 block (1 byte data and EOM/ACK)
- HDMI-CEC receiver
 - Automatic ACK reply function available
 - Line error detection function available
- Remote control receiver
 - 4 bytes reception buffer
 - Repeat code detection function available

Smart Card Interface (Max 2 Channels)

- Compliant with ISO7816-3 specification
- Card Reader only/B class card only
- Available protocols
 - Transmitter: 8E2, 8O2, 8N2
 - Receiver: 8E1, 8O1, 8N2, 8N1, 9N1
 - Inverse mode
- TX/RX FIFO integrated (RX: 16-bytes, TX:16-bytes)

AES Calculator

- AES (Advanced Encryption Standard) calculator is an AES common key crypto accelerator that is compliant with FIPS (Federal Information Processing Standard Publication) 197.
- Available key length: 128/192/256-bit
- CBC mode and ECB mode support

Clock and Reset

- Clocks

A clock can be selected from five clock sources (two external oscillators, two built-in CR oscillator, and main PLL).

 - Main clock: 4 MHz to 40 MHz
 - Sub clock: 32.768 kHz
 - Built-in high-speed CR clock: 4 MHz
 - Built-in low-speed CR clock: 100 kHz
 - Main PLL clock
- Resets
 - Reset request from the INITX pin
 - Power on reset
 - Software reset
 - Watchdog timer reset
 - Low-voltage detection reset
 - Clock supervisor reset

Clock Supervisor (CSV)

The Clock Supervisor monitors the failure of external clocks with a clock generated by a built-in CR oscillator.

- If an external clock failure (clock stop) is detected, a reset is asserted.
- If an external frequency anomaly is detected, an interrupt or a reset is asserted.

Low-Voltage Detector (LVD)

This series monitors the voltage on the VCC pin with a 2-stage mechanism. When the voltage falls below a designated voltage, the Low-voltage Detector generates an interrupt or a reset.

- LVDR: monitor Vcc and auto-reset operation
- LVD1: monitor Vcc and error reporting via an interrupt
- LVD2: selectable to monitor Vcc or LVDI and error reporting via an interrupt

Low Power Consumption Mode

This series has six low power consumption modes.

- Sleep
- Timer
- RTC
- Stop
- Deep standby RTC (selectable between keeping the value of RAM and not)
- Deep standby Stop (selectable between keeping the value of RAM and not)

Peripheral Clock Gating

The system can reduce the current consumption of the total system with gating the operation clocks of peripheral functions not used.

VBAT

The consumption power during the RTC operation can be reduced by supplying the power supply independent VBAT pin. RTC (calendar circuit) / 32 kHz oscillation circuit. The following circuit can also be used.

- RTC
- 32 kHz oscillation circuit
- Power-on circuit
- Back up register: 32 bytes
- Port circuit

Debug

- Serial Wire Debug Port (SW-DP)
- Micro Trace Buffer (MTB)

Unique ID

A 41-bit unique value of the device has been set.

Power Supply

- Wide voltage range:
 - VCC = 1.65V to 3.6 V
 - VCC = 3.0V to 3.6V (when USB is used)
 - VCC = 2.2V to 3.6V (when LCDC is used)
- Power supply for VBAT: VBAT = 1.65 V to 3.6 V

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1. Product Lineup

Memory Size

Product Name		S6E1B84E/F/G	S6E1B86E/F/G
On-chip Flash memory	Upper Bank	256 Kbytes	512 Kbytes
	Lower Bank	48 Kbytes	48 Kbytes
On-chip SRAM		32 Kbytes	64 Kbytes

Function

Product Name			S6E1B84E0A S6E1B86E0A S6E1B84EHA S6E1B86EHA	S6E1B84F0A S6E1B86F0A S6E1B84FHA S6E1B86FHA	S6E1B84G0A S6E1B86G0A S6E1B84GHA S6E1B86GHA	
Pin count			80	100	120	
CPU			Cortex-M0+			
Frequency			40.8 MHz			
Power supply voltage range			1.65 V to 3.6 V			
USB 2.0 (Device/Host)			1 unit			
DSTC			64ch			
Multi-function Serial Interface (UART/CSIO (SPI)/I ² C/I ² S)			8ch (Max) with 128 bytes FIFO I ² S: ch.5, ch.6			
Base Timer (PWC/Reload timer/PWM/PPG)			8ch (Max)			
LCD controller			20SEG x 8COM(Max) / 24SEG x 4COM(Max)	32SEG x 8COM(Max) / 36SEG x 4COM(Max)	40SEG x 8COM(Max) / 44SEG x 4COM(Max)	
Multi-function Timer	A/D activation compare	6ch	1 unit			
	Input capture	4ch				
	Free-run timer	3ch				
	Output compare	6ch				
	Waveform generator	3ch				
	PPG	3ch				
Dual Timer			1 unit			
HDMI-CEC/ Remote Control Receiver			2ch (max)			
Smart Card Interface			2ch (max)			
Real-time Clock			1 unit (with battery power)			
Watch Counter			1 unit			
CRC Accelerator			Yes			
Watchdog timer			1ch (SW) + 1ch (HW)			
External Interrupt			24 pins (Max), NMI x 1			
I/O port			65 pins (Max)	82 pins (Max)	102 pins (Max)	
12-bit A/D converter			16ch (1 unit)	23ch (1 unit)	24ch (1 unit)	
CSV (Clock Supervisor)			Yes			
LVD (Low-voltage Detection)			2ch			
Built-in CR	High-speed		4 MHz			
	Low-speed		100 kHz			
Debug Function			SW-DP			
Unique ID			Yes			
AES Calculator			-	Yes ^{*1}	-	Yes ^{*1}

*1: AES Calculator is built in following products.

S6E1B86GHA, S6E1B84GHA, S6E1B86FHA, S6E1B84FHA, S6E1B86EHA, S6E1B84EHA

Note:

- All signals of the peripheral function in each product cannot be allocated by limiting the pins of package. It is necessary to use the port relocate function of the I/O port according to your function use.
See "11 Electrical Characteristics 11.4 AC Characteristics 11.4.3 Built-in CR Oscillation Characteristics" for accuracy of built-in CR.

2. Packages

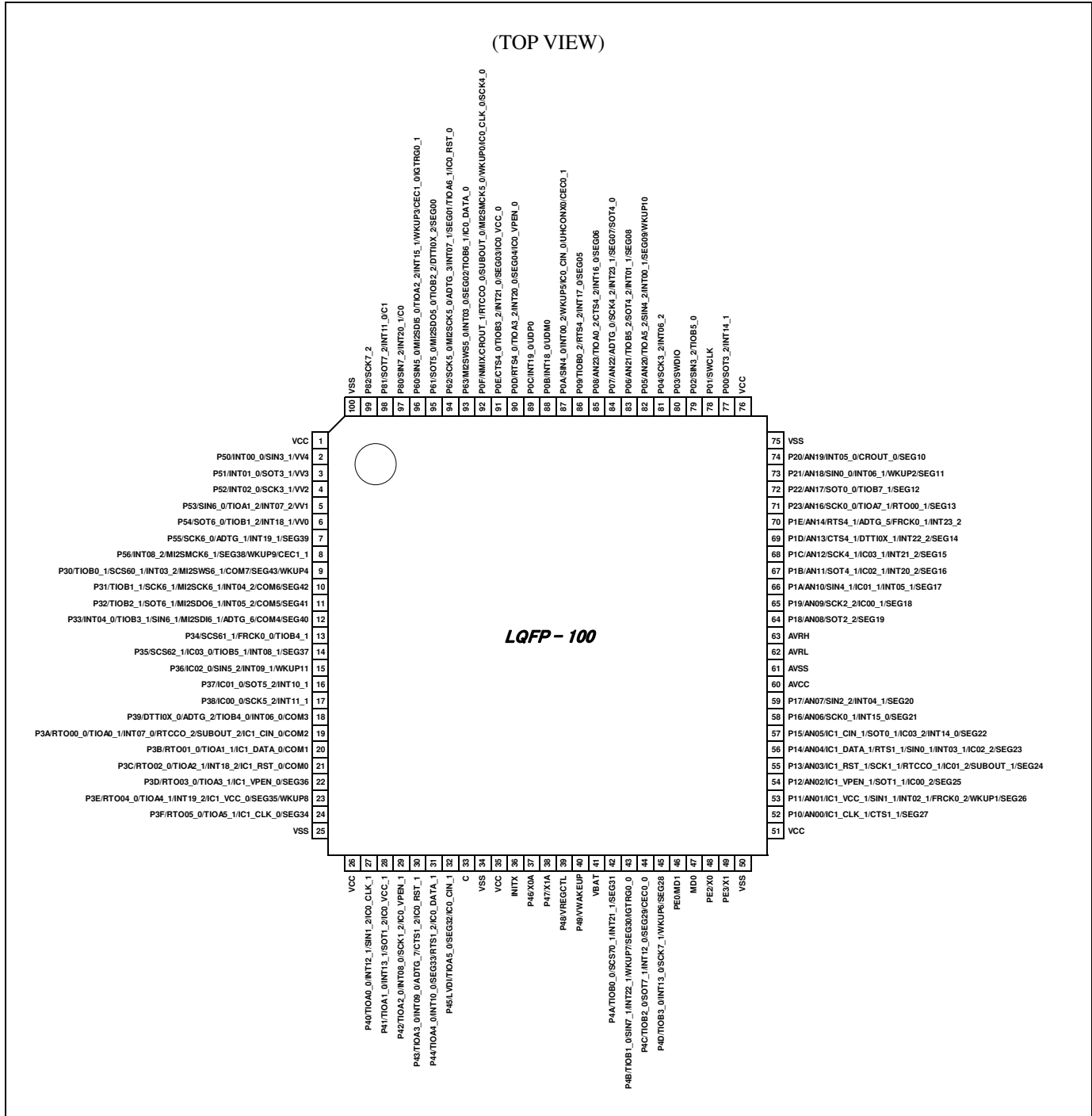
Product Name Package	S6E1B84E/S6E1B86E	S6E1B84F/S6E1B86F	S6E1B84G/S6E1B86G
LQFP: FPT-80P-M21 (0.50 mm pitch)	○	-	-
LQFP: FPT-100P-M20 (0.50 mm pitch)	-	○	-
LQFP: FPT-120P-M21 (0.50 mm pitch)	-	-	○

○: Available

Note:

- See "13. Package Dimensions" for detailed information on each package.

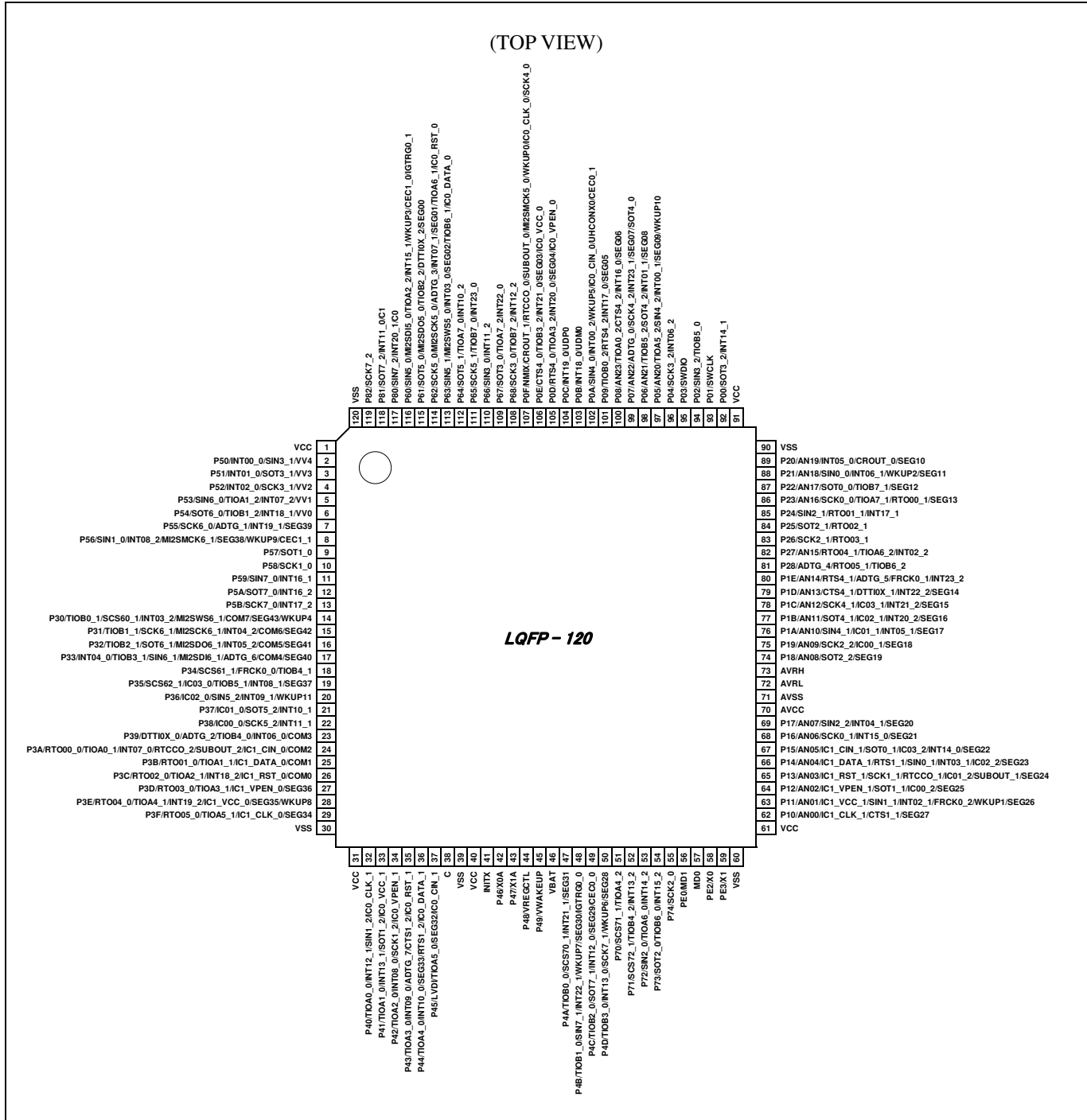
FPT-100P-M20



Note:

- The number after the underscore ("_") in a pin name such as XXX_1 and XXX_2 indicates the relocated port number. The channel on such pin has multiple functions, each of which has its own pin name. Use the Extended Port Function Register (EPFR) to select the pin to be used.

FPT-120P-M21



Note:

- The number after the underscore ("_") in a pin name such as XXX_1 and XXX_2 indicates the relocated port number. The channel on such pin has multiple functions, each of which has its own pin name. Use the Extended Port Function Register (EPFR) to select the pin to be used.

4. List of Pin Functions

List of Pin Numbers

The number after the underscore ("_") in a pin name such as XXX_1 and XXX_2 indicates the relocated port number. The channel on such pin has multiple functions, each of which has its own pin name. Use the Extended Port Function Register (EPFR) to select the pin to be used.

Pin No.			Pin Name	I/O Circuit Type	Pin State Type
LQFP-120	LQFP-100	LQFP-80			
1	1	1	VCC	-	
2	2	2	P50	Q	X
			SIN3_1		
			INT00_0		
			VV4		
3	3	3	P51	Q	X
			SOT3_1		
			INT01_0		
			VV3		
4	4	4	P52	Q	X
			SCK3_1		
			INT02_0		
			VV2		
5	5	5	P53	Q	X
			SIN6_0		
			TIOA1_2		
			INT07_2		
6	6	6	VV1	Q	X
			P54		
			SOT6_0		
			TIOB1_2		
7	7	7	INT18_1	L	S
			VV0		
			P55		
			SCK6_0		
8	8	8	ADTG_1	L	U
			INT19_1		
			SEG39		
			P56		
			MI2SMCK6_1		
			CEC1_1		
9	-	-	INT08_2	F	I
			WKUP9		
10	-	-	SEG38	F	I
			SIN1_0		
11	-	-	P57	F	J
			SOT1_0		
11	-	-	P58	F	J
			SCK1_0		
			P59		
11	-	-	SIN7_0	F	J
			INT16_1		

Pin No.			Pin Name	I/O Circuit Type	Pin State Type
LQFP-120	LQFP-100	LQFP-80			
12	-	-	P5A	F	J
			SOT7_0		
			INT16_2		
13	-	-	P5B	F	J
			SCK7_0		
			INT17_2		
14	9	9	P30	M	T
			TIOB0_1		
			SCS60_1		
			MI2SWS6_1		
			INT03_2		
			WKUP4		
			COM7		
SEG43					
15	10	10	P31	M	S
			TIOB1_1		
			SCK6_1		
			MI2SCK6_1		
			INT04_2		
			COM6		
SEG42					
16	11	11	P32	M	S
			TIOB2_1		
			SOT6_1		
			MI2SDO6_1		
			INT05_2		
			COM5		
SEG41					
17	12	12	P33	M	S
			TIOB3_1		
			SIN6_1		
			MI2SDI6_1		
			INT04_0		
			ADTG_6		
			COM4		
SEG40					
18	13	-	P34	I	I
			SCS61_1		
			FRCK0_0		
19	14	-	TIOB4_1	L	S
			P35		
			SCS62_1		
			IC03_0		
			TIOB5_1		
INT08_1					
SEG37					
20	15	-	P36	I	N
			IC02_0		
			SIN5_2		
			INT09_1		
WKUP11					
21	16	-	P37	I	J
			IC01_0		
			SOT5_2		
			INT10_1		

Pin No.			Pin Name	I/O Circuit Type	Pin State Type
LQFP-120	LQFP-100	LQFP-80			
22	17	-	P38	F	J
			IC00_0		
			SCK5_2		
			INT11_1		
23	18	13	P39	N	S
			DTTIOX_0		
			TIOB4_0		
			ADTG_2		
			INT06_0		
COM3					
24	19	14	P3A	N	S
			RTO00_0		
			TIOA0_1		
			RTCCO_2		
			SUBOUT_2		
			IC1_CIN_0		
			INT07_0		
COM2					
25	20	15	P3B	N	P
			RTO01_0		
			TIOA1_1		
			IC1_DATA_0		
COM1					
26	21	16	P3C	N	S
			RTO02_0		
			TIOA2_1		
			INT18_2		
			IC1_RST_0		
COM0					
27	22	17	P3D	L	P
			RTO03_0		
			TIOA3_1		
			IC1_VPEN_0		
SEG36					
28	23	18	P3E	L	T
			RTO04_0		
			TIOA4_1		
			IC1_VCC_0		
			INT19_2		
			WKUP8		
SEG35					
29	24	19	P3F	L	P
			RTO05_0		
			TIOA5_1		
			IC1_CLK_0		
SEG34					
30	25	20	VSS	-	-
31	26	-	VCC	-	-
32	27	-	P40	F	J
			TIOA0_0		
			IC0_CLK_1		
			INT12_1		
			SIN1_2		

Pin No.			Pin Name	I/O Circuit Type	Pin State Type
LQFP-120	LQFP-100	LQFP-80			
33	28	-	P41	F	J
			TIOA1_0		
			SOT1_2		
			IC0_VCC_1		
			INT13_1		
34	29	-	P42	F	J
			TIOA2_0		
			SCK1_2		
			IC0_VPEN_1		
			INT08_0		
35	30	-	P43	F	J
			TIOA3_0		
			CTS1_2		
			ADTG_7		
			IC0_RST_1		
36	31	21	INT09_0	L	S
			P44		
			TIOA4_0		
			IC0_DATA_1		
			INT10_0		
37	32	22	RTS1_2	L	P
			SEG33		
			P45		
			TIOA5_0		
			IC0_CIN_1		
38	33	23	LVDI	-	-
39	34	24	SEG32	-	-
40	35	25	C	-	-
41	36	26	VSS	-	-
42	37	27	VCC	B	C
43	38	28	INITX	D	E
			P46		
44	39	29	X0A	E	F
			P47		
45	40	30	X1A	I	I
			P48		
46	41	31	VREGCTL	I	I
			P49		
47	42	32	VWAKEUP	L	S
			VBAT		
			P4A		
			TIOB0_0		
			SCS70_1		
48	43	33	INT21_1	L	T
			SEG31		
			P4B		
			TIOB1_0		
			SIN7_1		
			INT22_1		
WKUP7					
			SEG30		
			IGTRG0_0		

Pin No.			Pin Name	I/O Circuit Type	Pin State Type
LQFP-120	LQFP-100	LQFP-80			
49	44	34	P4C	L	R
			TIOB2_0		
			SOT7_1		
			CEC0_0		
			INT12_0		
50	45	35	SEG29	L	T
			P4D		
			TIOB3_0		
			SCK7_1		
			INT13_0		
51	-	-	WKUP6	F	I
			SEG28		
			P70		
52	-	-	TIOA4_2	F	J
			SCS71_1		
			P71		
53	-	-	TIOB4_2	F	J
			SCS72_1		
			INT13_2		
54	-	-	INT14_2	F	J
			P72		
			SIN2_0		
55	-	-	TIOA6_0	F	I
			INT15_2		
			P73		
56	46	36	SOT2_0	F	J
			TIOB6_0		
			INT15_2		
57	47	37	P74	F	I
			SCK2_0		
58	48	38	PE0	C	D
			MD1		
59	49	39	MD0	A	A
			PE2		
60	50	40	X0	A	B
			PE3		
61	51	41	VSS	-	-
			VCC		
62	52	42	P10	P	K
			IC1_CLK_1		
			CTS1_1		
			AN00		
			SEG27		
63	53	43	P11	P	W
			IC1_VCC_1		
			SIN1_1		
			FRCK0_2		
			INT02_1		
			WKUP1		
			AN01		
SEG26					

Pin No.			Pin Name	I/O Circuit Type	Pin State Type
LQFP-120	LQFP-100	LQFP-80			
64	54	44	P12	P	K
			IC1_VPEN_1		
			SOT1_1		
			IC00_2		
			AN02		
65	55	45	SEG25	P	K
			P13		
			IC1_RST_1		
			SCK1_1		
			RTCCO_1		
			IC01_2		
66	56	46	SUBOUT_1	P	V
			AN03		
			SEG24		
			P14		
			IC1_DATA_1		
			RTS1_1		
67	57	47	SIN0_1	P	V
			IC02_2		
			INT03_1		
			AN04		
			SEG23		
			P15		
68	58	48	IC1_CIN_1	P	V
			SOT0_1		
			IC03_2		
			INT14_0		
			AN05		
			SEG22		
69	59	49	P16	P	V
			SCK0_1		
			INT15_0		
			AN06		
70	60	50	SEG21	-	-
			P17		
			SIN2_2		
			INT04_1		
71	61	51	AN07	-	-
			SEG20		
			AVCC		
72	62	52	AVSS	-	-
			AVRL		
73	63	53	AVRH	-	-
74	64	54	P18	P	K
			SOT2_2		
			AN08		
			SEG19		
75	65	55	P19	P	K
			SCK2_2		
			IC00_1		
			AN09		
			SEG18		

Pin No.			Pin Name	I/O Circuit Type	Pin State Type
LQFP-120	LQFP-100	LQFP-80			
76	66	56	P1A	P	V
			SIN4_1		
			IC01_1		
			INT05_1		
			AN10		
			SEG17		
77	67	57	P1B	P	V
			SOT4_1		
			IC02_1		
			INT20_2		
			AN11		
			SEG16		
78	68	-	P1C	P	V
			SCK4_1		
			IC03_1		
			INT21_2		
			AN12		
			SEG15		
79	69	-	P1D	P	V
			CTS4_1		
			DTTI0X_1		
			INT22_2		
			AN13		
			SEG14		
80	70	-	P1E	H	L
			RTS4_1		
			FRCK0_1		
			ADTG_5		
			INT23_2		
			AN14		
81	-	-	P28	F	I
			RTO05_1		
			TIOB6_2		
			ADTG_4		
82	-	-	P27	G	L
			RTO04_1		
			TIOA6_2		
			INT02_2		
83	-	-	P26	F	I
			SCK2_1		
			RTO03_1		
84	-	-	P25	F	I
			SOT2_1		
			RTO02_1		
85	-	-	P24	F	J
			SIN2_1		
			RTO01_1		
			INT17_1		
86	71	58	P23	P	K
			SCK0_0		
			TIOA7_1		
			RTO00_1		
			AN16		
			SEG13		

Pin No.			Pin Name	I/O Circuit Type	Pin State Type
LQFP-120	LQFP-100	LQFP-80			
87	72	59	P22	P	K
			SOT0_0		
			TIOB7_1		
			AN17		
88	73	60	SEG12	P	W
			P21		
			SIN0_0		
			INT06_1		
89	74	-	WKUP2	P	V
			AN18		
			SEG11		
			P20		
90	75	-	INT05_0	-	-
91	76	-	CROUT_0	-	-
92	77	61	AN19	I	J
			SEG10		
			VSS		
93	78	62	VCC	I	H
			P00		
			SOT3_2		
94	79	63	INT14_1	I	I
			P01		
			SWCLK		
95	80	64	P02	I	H
			SIN3_2		
			TIOB5_0		
96	81	65	P03	I	J
			SWDIO		
			P04		
97	82	-	SCK3_2	P	W
			INT06_2		
			P05		
			TIOA5_2		
			SIN4_2		
			INT00_1		
98	83	-	WKUP10	P	V
			AN20		
			SEG09		
			P06		
			TIOB5_2		
99	84	66	SOT4_2	P	V
			INT01_1		
			AN21		
			SEG08		
			P07		
99	84	66	SCK4_2	P	V
			ADTG_0		
			INT23_1		
			AN22		
			SEG07		
			SOT4_0		

Pin No.			Pin Name	I/O Circuit Type	Pin State Type
LQFP-120	LQFP-100	LQFP-80			
100	85	-	P08	P	V
			TIOA0_2		
			CTS4_2		
			INT16_0		
			AN23		
			SEG06		
101	86	-	P09	L	S
			TIOB0_2		
			RTS4_2		
			INT17_0		
102	87	67	SEG05	I	O
			P0A		
			SIN4_0		
			INT00_2		
			WKUP5		
			IC0_CIN_0		
103	88	68	UHC0N0	K	Q
			CEC0_1		
			P0B		
104	89	69	INT18_0	K	Q
			UDM0		
			P0C		
105	90	70	INT19_0	L	S
			UDP0		
			P0D		
			RTS4_0		
			TIOA3_2		
106	91	71	INT20_0	L	S
			SEG04		
			IC0_VPEN_0		
			P0E		
			CTS4_0		
107	92	72	TIOB3_2	I	G
			INT21_0		
			SEG03		
			IC0_VCC_0		
			P0F		
			CROUT_1		
108	-	-	RTCCO_0	F	J
			SUBOUT_0		
			MI2SMCK5_0		
			NMIX		
109	-	-	WKUP0	F	J
			IC0_CLK_0		
			SCK4_0		
			P68		
110	-	-	SCK3_0	F	J
			TIOB7_2		
			INT12_2		
109	-	-	P67	F	J
			SOT3_0		
			TIOA7_2		
110	-	-	INT22_0	F	J
			P66		
			SIN3_0		
			INT11_2		

Pin No.			Pin Name	I/O Circuit Type	Pin State Type
LQFP-120	LQFP-100	LQFP-80			
111	-	-	P65	F	J
			SCK5_1		
			TIOB7_0		
			INT23_0		
112	-	-	P64	F	J
			SOT5_1		
			TIOA7_0		
			INT10_2		
113	93	73	P63	L	S
			MI2SWS5_0		
			INT03_0		
	SEG02				
	TIOB6_1				
	IC0_DATA_0				
-	-	SIN5_1			
114	94	74	P62	L	S
			SCK5_0		
			MI2SCK5_0		
			ADTG_3		
			INT07_1		
			SEG01		
			TIOA6_1		
IC0_RST_0					
115	95	75	P61	L	P
			SOT5_0		
			MI2SDO5_0		
			TIOB2_2		
			DTTIOX_2		
SEG00					
116	96	76	P60	I	O
			SIN5_0		
			MI2SDI5_0		
			TIOA2_2		
			CEC1_0		
			INT15_1		
			WKUP3		
IGTRG0_1					
117	97	77	P80	O	J
			SIN7_2		
			INT20_1		
118	98	78	C0	O	J
			P81		
			SOT7_2		
			INT11_0		
119	99	79	C1	I	I
			P82		
120	100	80	SCK7_2	-	-
			VSS	-	-

*: 5 V tolerant I/O

List of Pin Functions

The number after the underscore ("_") in a pin name such as XXX_1 and XXX_2 indicates the relocated port number. The channel on such pin has multiple functions, each of which has its own pin name. Use the Extended Port Function Register (EPFR) to select the pin to be used.

Pin Function	Pin Name	Function Description	Pin No.		
			LQFP-120	LQFP-100	LQFP-80
ADC	ADTG_0	A/D converter external trigger input pin	99	84	66
	ADTG_1		7	7	7
	ADTG_2		23	18	13
	ADTG_3		114	94	74
	ADTG_4		81	-	-
	ADTG_5		80	70	-
	ADTG_6		17	12	12
	ADTG_7		35	30	-
	AN00	A/D converter analog input pin. ANxx describes ADC ch.xx.	62	52	42
	AN01		63	53	43
	AN02		64	54	44
	AN03		65	55	45
	AN04		66	56	46
	AN05		67	57	47
	AN06		68	58	48
	AN07		69	59	49
	AN08		74	64	54
	AN09		75	65	55
	AN10		76	66	56
	AN11		77	67	57
	AN12		78	68	-
	AN13		79	69	-
	AN14		80	70	-
	AN15		82	-	-
	AN16		86	71	58
	AN17		87	72	59
	AN18		88	73	60
	AN19		89	74	-
	AN20		97	82	-
	AN21		98	83	-
AN22	99		84	66	
AN23	100	85	-		
Base Timer 0	TIOA0_0	Base timer ch.0 TIOA pin	32	27	-
	TIOA0_1		24	19	14
	TIOA0_2		100	85	-
	TIOB0_0	Base timer ch.0 TIOB pin	47	42	32
	TIOB0_1		14	9	9
	TIOB0_2		101	86	-

Pin Function	Pin Name	Function Description	Pin No.		
			LQFP-120	LQFP-100	LQFP-80
Base Timer 1	TIOA1_0	Base timer ch.1 TIOA pin	33	28	-
	TIOA1_1		25	20	15
	TIOA1_2		5	5	5
	TIOB1_0	Base timer ch.1 TIOB pin	48	43	33
	TIOB1_1		15	10	10
	TIOB1_2		6	6	6
Base Timer 2	TIOA2_0	Base timer ch.2 TIOA pin	34	29	-
	TIOA2_1		26	21	16
	TIOA2_2		116	96	76
	TIOB2_0	Base timer ch.2 TIOB pin	49	44	34
	TIOB2_1		16	11	11
	TIOB2_2		115	95	75
Base Timer 3	TIOA3_0	Base timer ch.3 TIOA pin	35	30	-
	TIOA3_1		27	22	17
	TIOA3_2		105	90	70
	TIOB3_0	Base timer ch.3 TIOB pin	50	45	35
	TIOB3_1		17	12	12
	TIOB3_2		106	91	71
Base Timer 4	TIOA4_0	Base timer ch.4 TIOA pin	36	31	21
	TIOA4_1		28	23	18
	TIOA4_2		51	-	-
	TIOB4_0	Base timer ch.4 TIOB pin	23	18	13
	TIOB4_1		18	13	-
	TIOB4_2		52	-	-
Base Timer 5	TIOA5_0	Base timer ch.5 TIOA pin	37	32	22
	TIOA5_1		29	24	19
	TIOA5_2		97	82	-
	TIOB5_0	Base timer ch.5 TIOB pin	94	79	63
	TIOB5_1		19	14	-
	TIOB5_2		98	83	-
Base Timer 6	TIOA6_0	Base timer ch.6 TIOA pin	53	-	-
	TIOA6_1		114	94	74
	TIOA6_2		82	-	-
	TIOB6_0	Base timer ch.6 TIOB pin	54	-	-
	TIOB6_1		113	93	73
	TIOB6_2		81	-	-
Base Timer 7	TIOA7_0	Base timer ch.7 TIOA pin	112	-	-
	TIOA7_1		86	71	58
	TIOA7_2		109	-	-
	TIOB7_0	Base timer ch.7 TIOB pin	111	-	-
	TIOB7_1		87	72	59
	TIOB7_2		108	-	-
Debugger	SWCLK	Serial wire debug interface clock input pin	93	78	62
	SWDIO	Serial wire debug interface data input / output pin	95	80	64

Pin Function	Pin Name	Function Description	Pin No.		
			LQFP-120	LQFP-100	LQFP-80
External Interrupt	INT00_0	External interrupt request 00 input pin	2	2	2
	INT00_1		97	82	-
	INT00_2		102	87	67
	INT01_0	External interrupt request 01 input pin	3	3	3
	INT01_1		98	83	-
	INT02_0	External interrupt request 02 input pin	4	4	4
	INT02_1		63	53	43
	INT02_2		82	-	-
	INT03_0	External interrupt request 03 input pin	113	93	73
	INT03_1		66	56	46
	INT03_2		14	9	9
	INT04_0	External interrupt request 04 input pin	17	12	12
	INT04_1		69	59	49
	INT04_2		15	10	10
	INT05_0	External interrupt request 05 input pin	89	74	-
	INT05_1		76	66	56
	INT05_2		16	11	11
	INT06_0	External interrupt request 06 input pin	23	18	13
	INT06_1		88	73	60
	INT06_2		96	81	65
	INT07_0	External interrupt request 07 input pin	24	19	14
	INT07_1		114	94	74
	INT07_2		5	5	5
	INT08_0	External interrupt request 08 input pin	34	29	-
	INT08_1		19	14	-
	INT08_2		8	8	8
	INT09_0	External interrupt request 09 input pin	35	30	-
	INT09_1		20	15	-
	INT10_0	External interrupt request 10 input pin	36	31	21
	INT10_1		21	16	-
	INT10_2		112	-	-
	INT11_0	External interrupt request 11 input pin	118	98	78
INT11_1	22		17	-	
INT11_2	110		-	-	
INT12_0	External interrupt request 12 input pin	49	44	34	
INT12_1		32	27	-	
INT12_2		108	-	-	
INT13_0	External interrupt request 13 input pin	50	45	35	
INT13_1		33	28	-	
INT13_2		52	-	-	
INT14_0	External interrupt request 14 input pin	67	57	47	
INT14_1		92	77	61	
INT14_2		53	-	-	

Pin Function	Pin Name	Function Description	Pin No.		
			LQFP-120	LQFP-100	LQFP-80
External Interrupt	INT15_0	External interrupt request 15 input pin	68	58	48
	INT15_1		116	96	76
	INT15_2		54	-	-
	INT16_0	External interrupt request 16 input pin	100	85	-
	INT16_1		11	-	-
	INT16_2		12	-	-
	INT17_0	External interrupt request 17 input pin	101	86	-
	INT17_1		85	-	-
	INT17_2		13	-	-
	INT18_0	External interrupt request 18 input pin	103	88	68
	INT18_1		6	6	6
	INT18_2		26	21	16
	INT19_0	External interrupt request 19 input pin	104	89	69
	INT19_1		7	7	7
	INT19_2		28	23	18
	INT20_0	External interrupt request 20 input pin	105	90	70
	INT20_1		117	97	77
	INT20_2		77	67	57
	INT21_0	External interrupt request 21 input pin	106	91	71
	INT21_1		47	42	32
	INT21_2		78	68	-
	INT22_0	External interrupt request 22 input pin	109	-	-
	INT22_1		48	43	33
INT22_2	79		69	-	
INT23_0	External interrupt request 23 input pin	111	-	-	
INT23_1		99	84	66	
INT23_2		80	70	-	
	NMIX	Non-Maskable Interrupt input pin	107	92	72
GPIO	P00	General-purpose I/O port 0	92	77	61
	P01		93	78	62
	P02		94	79	63
	P03		95	80	64
	P04		96	81	65
	P05		97	82	-
	P06		98	83	-
	P07		99	84	66
	P08		100	85	-
	P09		101	86	-
	P0A		102	87	67
	P0B		103	88	68
	P0C		104	89	69
	P0D		105	90	70
	P0E		106	91	71
P0F	107	92	72		